

CURRENT STATUS OF TRICHINOSIS IN SWINE IN THE ATLANTIC PROVINCES

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INTRODUCTION

IN 1952, FRANK (2) reported a 0.4% incidence of trichinosis in 1002 swine originating in the Maritime provinces. In 1962, Frank and Wood (3) reported a 0.25% incidence in 789 garbage-fed swine examined between 1954 and 1958 in the Atlantic provinces.

In 1968, the Meat Inspection Division of the Health of Animals Branch in the Atlantic region initiated a program of examining porcine tissues for trichinosis at the time of slaughter. In 1971, the Animal Pathology Division initiated investigations on the incidence of urban and sylvan trichinosis in various animal species in the Atlantic provinces. This report will deal only with field and laboratory investigations of trichinosis in swine in the Atlantic area from 1968 to 1975.

MATERIALS AND METHODS

Diaphragmatic muscle was routinely collected for examination from swine at the time of slaughter in ten Federally-inspected abattoirs located in the four Atlantic provinces. Masseter and intercostal muscle were also collected from those swine that originated from infected premises or within the endemic area. Since it was not possible to examine all swine, tissues were first taken from sows, stags, garbage-fed swine, and swine originating within endemic areas and then from other market hogs as time and personnel permitted. Once trichinosis was diagnosed on a premises, all remaining animals were slaughtered and examined, a cleaning and disinfection regime was carried out, and a rat control program was undertaken.

Tissues were examined in the abattoirs by the trichinoscopic technique. The digestion method was used on those tissues examined at the laboratory. During a four month period in

1973 in excess of 9000 samples were examined in the laboratory by the pooled digestion technique. Tissues from infected herds at slaughter were also examined at the laboratory.

Trichinoscopic examination was carried out by crushing seven teased pieces (about 2 cm in diameter) of muscle from each carcass between the two glass plates of the compressor apparatus before placement in a trichinoscope¹ which magnified the image 80× and projected it onto a screen for viewing.

Initially, the digestion procedure followed was that described by Frank (2) in which 50 gm of tissue from each carcass was finely chopped or ground, incubated in 500 ml of a pepsin digestion mixture (0.6% pepsin - 0.8% HCl in distilled water) for 20 to 24 hours, followed by transfer to a Baermann apparatus for another 24 hrs before examination of the digest for viable trichinae. Later, a modification of the pooled sample method described by Zimmermann (7) was followed. Five gm samples from each of ten carcasses were pooled and either chopped by scissors or finely ground in a meat grinder² and digested as described above.

RESULTS

Tissue Examinations

The number of swine examined by trichinoscopy in the abattoirs from 1968 to 1975 and the number of trichinosis-positive carcasses and premises are given in Table I. The incidence of infection was 0.13%.

Tissues from 52 infected carcasses were examined by both the trichinoscopic and digestion techniques. Thirty-eight were positive for trichinosis by both techniques. Four were positive only by the trichinoscopic examination and ten were positive only by the digestion method. During the four month period in 1973 when in excess of 9000 samples were examined by the pooled digestion technique, only one positive carcass was uncovered. This animal was detected by both the trichinoscopic and digestion methods.

¹Leitz Wetzlar 1 X Q Model 2, Ernst Leitz (Canada) Ltd., Midland, Ontario.

²Hobart Model 4612 Chopper, The Hobart Mfg. Co. Limited, Don Mills, Ontario.

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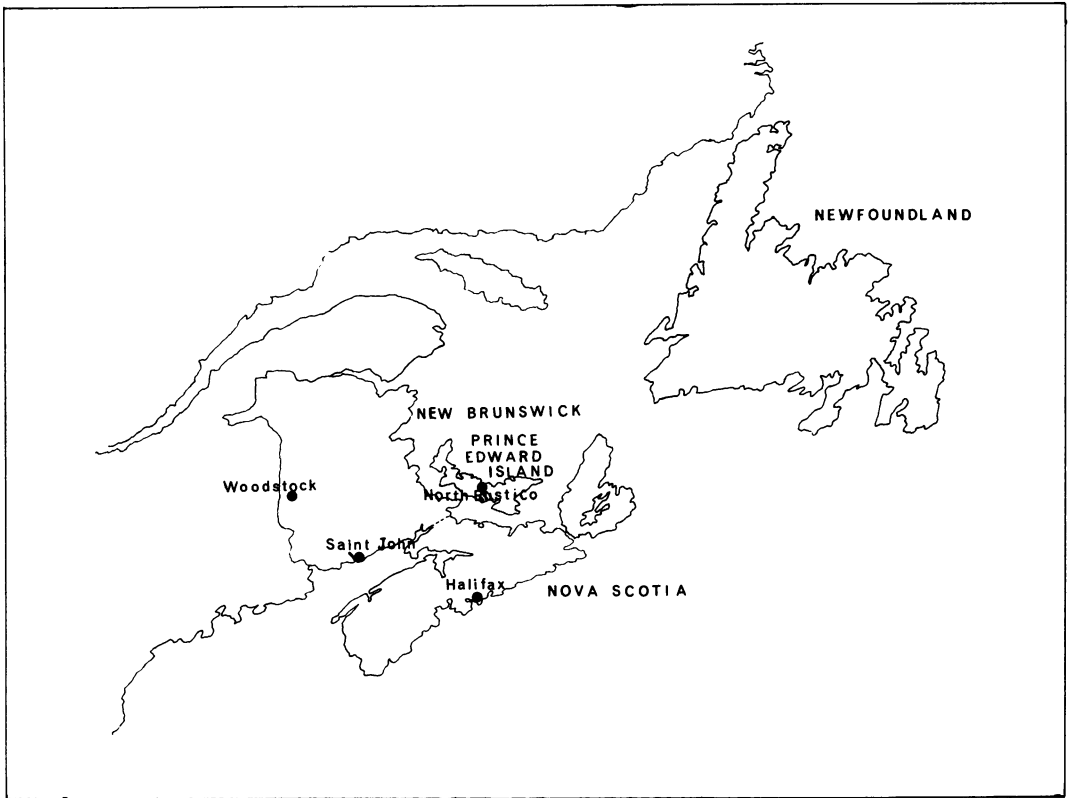


FIGURE 1. Map of Atlantic provinces indicating foci of trichinosis in swine, 1968-1975.

TABLE I
THE NUMBER OF SWINE CARCASSES EXAMINED,
NUMBER INFECTED AND NUMBER OF INFECTED
HERDS IN THE ATLANTIC PROVINCES
FROM 1968-1975

Year	No. Examined	No. Infected	No. Infected Herds
1968-70	11,344	0	0
1971	5,434	22	6
1972	7,736	53	2
1973	22,873	2	2
1974	15,237	9	2
1975	5,827*	2	2

*For period January 1 to June 30.

The foci of known infections in the Atlantic provinces from 1968 to 1975 are given in Figure 1. Eleven of the 14 infected swine herds were located in three small adjacent communities east of Halifax, Nova Scotia with the focus of infection limited to a radius of less than five miles. The three remaining infected herds were located near North Rustico, Prince Edward Island and Saint John and Woodstock in New Brunswick.

The size and the number of infected animals in each of the 14 infected herds are given in

Table II. Nine herds had only one infected animal. All herds with more than one infected animal were from the Halifax focus.

Field Investigations

Investigations of the 11 infected herds in the Halifax focus of infection revealed that licensed garbage-feeding was practiced on seven premises. The presence of rats and tail chewing were observed in a majority of the herds. Most of the piggeries were of older, wooden construction which did not facilitate rat and other control programs. A number of the infected premises were within a few hundred yards of each other. The investigation of one of these premises in 1972 proved most interesting. All marketed swine from this premises had remained negative for trichinosis over a period of between one to two years. When trichinosis was diagnosed in an adjacent herd 200 yards distant, this latter herd was slaughtered and thorough sanitation and rat control programs were instituted. Following the institution of rat control measures and depopulation of swine on the infected premises, a large increase in the number of rats on the noninfected premises soon became evident. Approximately three months after the sudden

TABLE II

THE HERD SIZE AND NUMBER OF INFECTED SWINE IN EACH OF THE 14 INFECTED HERDS FOUND IN THE ATLANTIC PROVINCES FROM 1968-1975

Herd No.	Focus	No. in Herd	No. Infected
1	Halifax, N.S.	57	21
2	"	74	30
3	"	2	1
4	"	25	5
5	"	113	1
6	"	50	1
7	"	37	15
8	"	9	1
9	"	1	1
10	North Rustico, P.E.I.	134	1
11	Saint John, N.B.	3	1
12	Halifax, N.S.	44	8
13	Woodstock, N.B.	13	1
14	Halifax, N.S.	5	1

increase in rats, trichinosis was diagnosed at slaughter in swine from this herd. Upon depopulation of this herd, several weanlings as well as older swine were found to be infected. Infection in this herd seemed to coincide with the arrival of rats from the neighbouring infected premises.

In 1974-75, a similar observation was made in the last two infected herds identified in the Halifax focus. Infection was diagnosed in the first of these herds in August 1974. The herd was immediately depopulated, followed by the institution of sanitation and rat control procedures. In April 1975 trichinosis was diagnosed for the first time in a herd on an adjacent premises one to two hundred yards away.

The infection in the North Rustico, P.E.I. focus was limited to one sow in one large herd. Management and facilities were excellent and garbage feeding was not practiced. Investigation revealed that the sows of this herd were pastured adjacent to a wildlife park. A few months earlier, a rat control program at the park had been undertaken and some of the rats were known to have migrated into the pasture and died.

The two foci in New Brunswick were limited to one animal in each of two small herds. Both premises had had a problem with rats. The Saint John focus was situated near a garbage dump. Cats had been observed dragging dead rats onto the premises. Also, a raccoon carcass had been fed to the pigs. Neither premises was licensed to feed garbage, nor was there evidence to indicate that garbage was being fed surreptitiously.

Following depopulation and introduction of other control programs, 11 of the 14 infected premises were repopulated with swine. To

date, based on regular monitoring of all swine marketed from these herds, all have remained free of trichinosis.

DISCUSSION

The results suggest that the incidence of trichinosis in the Atlantic provinces is low, particularly in consideration of the large number of porcine carcasses examined over a seven year period. The 0.13% incidence observed during this period compares favourably with that recorded previously from this area twenty years earlier (2, 3).

In excess of 95% of all infected swine discovered in these investigations originated within the one focus of infection near Halifax, Nova Scotia. The single focus in Prince Edward Island and two foci in New Brunswick consisted of single infected animals in each. Actually only five of the 14 infected herds had more than one infected animal.

The source of infection or mode of transmission within herds with several infected animals were not determined with certainty. Field investigation in several instances indicated that rats may have been involved, although the incidence of trichinosis in rats in the Atlantic provinces is not known because of a paucity of information on this particular aspect of the disease. In 1964 one of us (H. J. S.) demonstrated a 22.2% incidence of trichinosis in rats captured in the Sackville, New Brunswick community dump (unpublished data).

Garbage-feeding and tail chewing have been suggested by other investigations as possible modes of transmission (5, 8). In the Halifax focus of infection, seven of the 11 infected premises were licensed to feed garbage and tail-chewing was frequently observed. The feeding of offal from infected animals is another possible source of infection, particularly in herds with a number of infected animals. It is known that swine are slaughtered for home use within the Halifax focus of infection but it could not be established if this practice had been carried out on any of the 11 infected premises.

It should be pointed out that Canada in 1971 declared trichinosis a named disease (1). This has made it possible to institute control procedures to eliminate foci of infections. Immediate slaughter of infected herds has also made it possible to determine the magnitude and extent of infection within herds. To date, these control procedures appear to be effective as trichinosis has not re-established in the 11 herds which have been repopulated with swine.

The trichoscopic technique as used in these investigations proved to be useful, since infection in all herds was first detected by trichoscopy. The results substantiate the fact that it is not quite as reliable as the digestion method in very light infections because considerably less tissue is examined in the trichoscopic procedure. This was also the conclusion of comparative studies in five European laboratories (4). On the other hand, the digestion method cannot be used to detect infection much before three weeks postinfection. Villella (6) noted that the resistance of trichinae to peptic digestion is regarded as a criterion of their infectiousness for another host and that the age at which they first become infective for a new host is variously stated to be between 17 and 21 days after infection. It was assumed in this study that those carcasses which were positive by trichoscopy and negative by the digestion method were recent infections. In two such instances, the tissues were taken from weanlings.

While the digestion method is the more sensitive test, it also takes longer to perform and if transportation of tissues is involved, still further delay may occur. Conversely, with the same technical assistance, it is possible to examine more specimens by the digestion method.

SUMMARY

From 1968 to 1975, 68,451 porcine carcasses were examined by trichoscopy and in excess of 9000 by the digestion method for the presence of trichinosis in the Atlantic provinces of Canada. The incidence of infection was 0.13% with the disease being detected in 14 herds located in four foci. Nine of the 14 infected herds had single cases only.

The source of infection or mode of transmission within infected herds were not established, but evidence indicates that known methods of transmission such as rats, garbage feeding and tail-chewing were present.

RÉSUMÉ

De 1968 à 1975, on a examiné 68,451 carcasses de porc au trichoscope et au delà de 9,000, par la méthode de la digestion, comme moyens de dépistage de la trichinose chez les

porcs des provinces Atlantiques du Canada. L'incidence de cette condition s'établissait à 0.13%; on décela la maladie dans 14 troupeaux situés dans quatre endois. Dans neuf de ces 14 troupeaux, on ne décela qu'un seul sujet atteint de trichinose.

On n'a pas réussi à préciser la source de contamination ou le mode de transmission au sein des troupeaux parasités; il semble cependant que les facteurs de transmission connus: rats, alimentation avec des déchets de cuisine et mordillage de la queue, étaient en cause.

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